What is claimed is:

1. A collective detection method for wavelength fluctuations of signals for use in a wavelength division multiplexing optical communication system including:

a step of photoelectrically converting wavelength division multiplexed transmission lights consisting of signal lights of a plurality of wavelengths having undergone modulation with mutually different frequencies after causing the lights to be transmitted by optical filters having a plurality of wavelength pass bands, and causing said photoelectrically converted electrical signals to be transmitted by first band pass filters the pass band of each of which is said modulation frequency; and a step of detecting the output level of the pass band of each of said first band pass filters and thereby detecting any fluctuation in each of the wavelengths said wavelength division multiplexed transmission lights contain.

2. The collective detection method for wavelength fluctuations, as claimed in Claim 1, further including:

a step of branching part of said wavelength division multiplexed transmission lights, photoelectrically converting the branched lights and causing said photoelectrically converted electrical signals to be transmitted by second band pass filters having the same characteristics as said first band pass filters; and

a step of dividing, before detecting the output level of the pass band of each of said first band pass filters, the output

level of the pass bands of said first band pass filters by the output levels of the pass bands of the respectively matching ones of said second band pass filters.

3. The collective detection method for wavelength fluctuations, as claimed in Claim 1, wherein:

the wavelength of each of said signal lights is initially set in a wavelength band between the pass band and the stop band of said optical filter before said detection of wavelength fluctuations is started.

4. The collective detection method for wavelength fluctuations, as claimed in Claim 1, wherein:

the wavelength band between the pass band and the stop band of said optical filter is so set as to include the wavelength of each of said signal lights before said detection of wavelength fluctuations is started.

5. A collective detection system for wavelength fluctuations for use in a wavelength division multiplexing optical communication system is provided with:

an optical filtering means having a plurality of wavelength pass bands for transmitting wavelength division multiplexed transmission lights consisting of a plurality of signal lights having undergone modulation with mutually different frequencies;

a means for collectively receiving and photoelectrically converting the lights transmitted by said

optical filtering means;

first band pass filtering means each having as its pass band said modulation frequency of each of said photoelectrically converted electrical signals; and

a means for detecting the output level of the pass band of each of said band pass filtering means and detecting any fluctuation in each of the wavelengths said wavelength division multiplexed transmission lights contain.

6. The collective detection system for wavelength fluctuations, as claimed in Claim 5, further provided with:

second band pass filtering means having the same characteristics as said first band pass filtering means for branching part of said wavelength division multiplexed transmission lights, photoelectrically converting the branched lights and transmitting said photoelectrically converted electrical signals; and

a means for dividing, before detecting the output level of the pass band of each of said first band pass filters, the output level of the pass bands of said first band pass filters by the output levels of the pass bands of the respectively matching ones of said second band pass filters.

7. The collective detection system for wavelength fluctuations, as claimed in Claim 5, wherein:

the wavelength of each of said signal lights is initially set in a wavelength band between the pass band and the stop band of the optical filtering means before said detection of

wavelength fluctuations is started.

8. The collective detection system for wavelength fluctuations, as claimed in Claim 5, wherein:

a wavelength band between the pass band and the stop band of said optical filtering means is so set as to include the wavelength of each of said signal lights before said detection of wavelength fluctuations is started.

9. The collective detection system for wavelength fluctuations, as claimed in Claim 5, wherein:

said band pass filtering means consists of a plurality of band pass filters arranged in parallel.

10. The collective detection system for wavelength fluctuations, as claimed in Claim 5, wherein:

said band pass filtering means are provided with:

a means for digitally converting the output signals of said photoelectric conversion means and

a signal processing means having a digital filtering function.

11. A wavelength division multiplexing optical transmission apparatus for stabilizing wavelengths by feeding back outputs of detection of wavelength fluctuations provided with:

a plurality of optical transmission means each comprising a semiconductor laser for oscillating signal lights

having different wavelengths and modulated with different frequencies and a temperature controller for controlling the temperature of said semiconductor laser;

a wavelength division multiplexing means for multiplexing said plurality of signal lights into wavelength division multiplexed transmission lights and sending them out;

a means for branching part of said wavelength division multiplexed transmission lights;

an optical filtering means having a plurality of pass bands and transmitting the branched component of said wavelength division multiplexed transmission lights;

a means for collectively receiving and photoelectrically converting the lights transmitted by said optical filtering means; and

first band pass filtering means having as their respective pass bands said photoelectrically converted electrical signals, and each supplying the output of the pass band to said temperature controller for controlling the temperature of said semiconductor laser modulated with the matching frequency, wherein:

each of said temperature controllers controls the temperature of the matching one of said semiconductor lasers so as to keep the outputs of said first band pass filtering means at a prescribed level and thereby stabilizes each of the wavelengths said wavelength division multiplexed transmission lights contain.

12. The wavelength division multiplexing optical

transmission apparatus, as claimed in Claim 11, further provided with:

second band pass filtering means, having the same characteristics as said first band pass filtering means, for further branching and photoelectrically converting part of said wavelength division multiplexed transmission lights and transmitting photoelectrically converted electrical signals; and

a means for dividing, before supplying the outputs of the pass band of each of said first band pass filtering means to said temperature controllers, the output levels of the pass bands of said first band pass filtering means by the output levels of the pass bands of the respectively matching ones of said second band pass filtering means.

13. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 11, wherein:

the wavelength of each of said signal lights is initially set in a wavelength band between the pass band and the stop band of said optical filtering means before said detection of wavelength fluctuations is started.

14. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 11, wherein:

a wavelength band between the pass band and the stop band of said optical filtering means is so set as to include the wavelength of each of said signal lights before said detection of wavelength fluctuations is started.

15. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 11, wherein:

said band pass filtering means consist of a plurality of electrical band pass filters arranged in parallel.

16. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 11, wherein:

said band pass filtering means are provided with:

means for digitally converting the output signals of said photoelectric conversion means and

signal processing means having a digital filtering function.

17. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 11, wherein:

said optical filtering means are arrayed waveguide grating (AWG) type spectral elements.

18. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 11, wherein:

fiber Bragg grating (FBG) type spectral elements.

19. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 11, wherein:

said optical filtering means are Fabry-Perot etalon type spectral elements.

20. A wavelength division multiplexing optical transmission apparatus for stabilizing wavelengths by feeding back outputs of detection of wavelength fluctuations provided with:

a plurality of optical transmission means each comprising a semiconductor laser for oscillating signal lights having different wavelengths and modulated with different frequencies and a temperature controller for controlling the temperature of said semiconductor laser;

a wavelength division multiplexing means for multiplexing said plurality of signal lights into wavelength division multiplexed transmission lights and sending them out;

a means for branching part of said wavelength division multiplexed transmission lights;

an optical filtering means having a plurality of pass bands and transmitting the branched component of said wavelength division multiplexed transmission lights;

a means for collectively receiving and photoelectrically converting the lights transmitted by said optical filtering means; and

first band pass filtering means having as their respective pass bands said photoelectrically converted electrical signals, and each supplying the output of the pass band to said temperature controller for controlling the temperature of said semiconductor laser modulated with the matching frequency, wherein:

each of said temperature controllers causes the temperature of the matching one of said semiconductor lasers

to fluctuate at a low frequency and controls the temperature of said semiconductor laser so as to minimize said low frequency outputs of said first band pass filtering means and thereby stabilizes each of the wavelengths said wavelength division multiplexed transmission lights contain.

21. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, further provided with:

second band pass filtering means, having the same characteristics as said first band pass filtering means, for further branching and photoelectrically converting part of said wavelength division multiplexed transmission lights and transmitting photoelectrically converted electrical signals; and

a means for dividing, before supplying the outputs of the pass band of each of said first band pass filtering means to said temperature controllers, the output levels of the pass bands of said first band pass filtering means by the output levels of the pass bands of the respectively matching ones of said second band pass filtering means.

22. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, wherein:

the wavelength of each of said signal lights is initially set in the pass band of said optical filtering means before said detection of wavelength fluctuations is started.

23. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, wherein:

the pass band of said optical filtering means is so set as to include the wavelength of each of said signal lights before said detection of wavelength fluctuations is started.

24. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, wherein:

said band pass filtering means consist of a plurality of electrical band pass filters arranged in parallel.

25. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, wherein:

said band pass filtering means are provided with:

means for digitally converting the output signals of said photoelectric conversion means and

signal processing means having a digital filtering function.

26. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, wherein:

said optical filtering means are arrayed waveguide grating (AWG) type spectral elements.

27. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, wherein:

fiber Bragg grating (FBG) type spectral elements.

28. The wavelength division multiplexing optical transmission apparatus, as claimed in Claim 20, wherein:

said optical filtering means are Fabry-Perot etalon type spectral elements.